[11839/15]

ADJUSTABLE STEERING COLUMN

FIELD OF THE INVENTION

The present invention relates to an adjustable steering column.

BACKGROUND INFORMATION

A steering column is generally fixed mechanically (jammed) in the position desired by the driver via a worm gear, via rocker arms or according to the principle of the inclined plane (wedge effect). Disadvantageous in this context is that the clamping force must be applied manually. As a result, it is highly specific to the person, so that clamping reliability is only partially fulfilled. Furthermore, the arresting device can loosen during travel operation due to settling of the components.

In the case of pneumatic actuation, the clamping force is generated by a compression spring or disk spring and is intensified via levers or according to the principle of the inclined plane.

To release the clamping force/arresting, the prestress force of the compression or disk spring is offset by way of a piston actuated by compressed air (compressed air cylinder).

Disadvantages of such steering columns include the high number of parts and the cost.

SUMMARY

An example embodiment of an adjustable steering device according to the present invention may provide the following advantage: It includes a sturdy, inexpensive and functionally reliable arresting device for actuation by hand or pneumatically or electromagnetically, particularly electromotively.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 schematically illustrates a bearing block having guide plates of a guide part for an adjustable steering column according to the present invention.

Figure 2 schematically illustrates a modified segment from Figure 1.

Figure 3 schematically illustrates a further modification.

DETAILED DESCRIPTION

Identical parts in different figures are provided with identical reference numerals.

In Figure 1, located between side parts 4a, 4b of a bearing block, which is boltable to a driver's cab, are guide plates 2, 3 of a guide part, with the aid of which a section of a steering column is able to be guided. Side part 4a, together with guide plate 2, forms a first locating or arresting coupling. Side part 4b, together with guide plate 3, forms a further locating coupling. The two locating couplings are opposite one another. Arranged between the two medial coupling parts 2, 3, which correspond to one another and belong to different locating couplings, is a torsion spring as a pressure element, e.g., a leaf spring 1 prestressed to the point of buckling. This is used as a source of force for a clamping force as is needed for closing the locating coupling.

Leaf spring 1 braces guide plates 2 and 3 against side parts 4a and 4b of the bearing block, which form the respective outer coupling parts of the two locating couplings.

These two mutually corresponding outer coupling parts 4a, 4b are interconnected by a tension element, e.g., by a threaded member 5 which is used to support the clamping force (spreading force) generated by leaf spring 1. This permits a less stable, and thus cost-effective configuration of the bearing block.

Threaded member 5 is used as mounting for a guide tube 6 and (via guide tube 6) for a pneumatic cylinder housing 7 of a

compressed air cylinder 12. Cylinder housing 7 is configured such that it accommodates guide tube 6 in bore holes 8, 9, and the ends of leaf spring 1 in elongated holes 10, 11.

If fluid, e.g., compressed air, acts upon compressed air cylinder 12, then, as Figure 1 illustrates, a piston 13, via its piston rod 13a, deflects leaf spring 1. The effective length of the leaf spring is thereby shortened ("compressed state" of the leaf spring), and the arresting by the locating couplings is canceled - guide parts 2, 3 for the steering column are able to be adjusted.

If the pressure in compressed air cylinder 12 is reduced, then leaf spring 1 springs back into its released position ("expanded state" of the leaf spring), and the guide part for the steering column is again located in position by the locating couplings.

The clamping force of leaf spring 1 may be intensified by an additional spring (compression spring 15), so that leaf spring 1 may be dimensioned to have weaker power.

A further advantage of compression spring 15 is that in the clamping position, all components are braced against each other by the compression spring, and thus no rattles occur during travel operation. A stop 14 ensures that the leaf spring does not buckle into the opposite direction.

Figure 2 illustrates a possible design approach for a manually actuated retention. Leaf spring 1 is also used as pressure and clamping element.

The retention is released via an eccentric lever 16: Upon actuation of the eccentric lever, the leaf spring is deflected in a conventional manner.

Figure 3 illustrates a possible electromotive design approach. An E-motor M actuates leaf spring 1 in a conventional manner via a worm gear 17.